

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-234003

(43)Date of publication of application : 29.08.2000

(51)Int.Cl.

C08F220/58  
A61K 7/00  
A61K 47/32  
C08F226/02

(21)Application number : 2000-033711

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(22)Date of filing : 10.02.2000

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(30)Priority

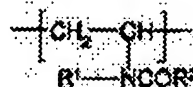
Priority number : 99 19905639 Priority date : 11.02.1999 Priority country : DE

## (54) WATER-SOLUBLE OR WATER-SWELLABLE POLYMER

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a water-soluble or water-swellaable polymer by adding an N-vinylcarboxamide to an ammonium salt of an acrylamidoalkylsulfonic acid, adding a small amount of a crosslinking substance having at least two olefinic double bonds to the mixture, and polymerizing the entire mixture.

SOLUTION: An ammonium salt (49.99-98.99 pts.wt.) of an acrylamidoalkylsulfonic acid, represented by formula III (wherein R<sup>3</sup> is H or methyl; and Z is a 1-4C alkylene) is dissolved in an alcoholic solvent, 1-50 pts.wt. N-vinylcarboxamide represented by formula IV (wherein R<sup>1</sup> and R<sup>2</sup> are each H or methyl) is added to the solution, and 0.01-5 pts.wt. crosslinking monomer having at least two double bonds is added to the solution. The resultant mixture is polymerized in the presence of a free-radical-forming compound. Thus, it is possible to obtain a water-soluble or



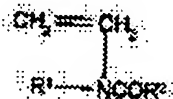
I



II



III



IV

water-swellaible polymer containing crosslinkages derived from the crosslinking monomer, repeating units represented by formula I, and repeating units represented by formula II in a random manner and in a ratio equal to that of the weights of the added monomers.

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## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

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[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

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**PRIOR ART**

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[Description of the Prior Art] or [ that the multicomponent system containing water or a solvent, for example, a solution, an emulsion, or suspension is often adjusted by higher viscosity in consideration of stability from the reason of costs or an engine-performance side ] -- or it is thickening-ized. For example, by raising the viscosity of the continuous phase of an emulsion or suspension, or a discontinuous phase, time amount until each component of such a system dissociates can be extended considerably, and this becomes clear from storage life being prolonged. Moreover, by raising viscosity, they can be applied more now to homogeneity and the effectiveness is remarkable in many systems on the front face which is not especially flat. In the case of a skin care supply and the ointment-like drugs for the skins, this is applied especially. It can prevent these agents flowing out of the front face which should be processed at the beginning of a stage by [ of many industrial products, for example, wallpaper, ] removing and raising those viscosity in the case of \*\*, a paint remover, or the anti-icing agent of an airplane. Effectiveness increases by lengthening applying to homogeneity more, and contact time. The high viscosity of this kind of formulation other than the advantage in respect of the above-mentioned engine performance also brings about the further advantage in the case of preparation, a package, containerization, and storage, and the advantage in the case of transportation in a list, and especially thickening-ization of an acid medium is meaningful from a safety aspect in this case.

[0003] Generally, preparation of cosmetics, drugs, or an industrial use formulation and/or the flow (rheology) property in the case of a formula are one of the decisive standards which is in charge of actual use of these products. Although it is very little, and the used thickener should attain sufficient thickening-ized effectiveness even when used, it is one side and the color and major characteristic of a medium which are thickening-ized must not have change.

[0004] Many various systems are indicated by the reference by the expert about accommodation of the flowability of the system containing a water system or a water solvent, an emulsion, and suspension. A well-known example is cellulose ether and other cellulose (for example, a carboxymethyl cellulose, hydroxyethyl cellulose), gelatin, starch and the derivative of starch, sodium alginate, fatty-acid polyethylene glycol ester, an agar, tragacanth gum, or a dextrin. The synthetic polymers used are the mixture with the above-mentioned various compounds in the copolymer of the various salts of various ingredients, for example, polyvinyl alcohol, polyacrylamide, polyacrylic acid, and polyacrylic acid, a polyvinyl pyrrolidone, polyvinyl methyl ether, polyethylene oxide, a maleic anhydride, and vinyl methyl ether, and a list, and a copolymer.

[0005] However, the above-mentioned compound has various faults at the time of use. For example, these compounds are very sensitive to a cellulosic and the ingredient list based on a natural raw material generally to bacteria. Those most cause the phenomenon of forming the gel which is not desirable and "which pulls yarn", in the case of use. Tending to hydrolyze fatty-acid polyethylene glycol ester under existence of water, the produced insoluble fatty acid causes the cloudiness which is not desirable. Depending on the origin, as for the thickener (for example, an agar or tragacanth gum) based on a natural product, a presentation is changed sharply.

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patent application public presentation 98th -- /00 094 a number -- 2-acrylamide-2- The approach of using as a thickener the homopolymer and this over which methyl propanesulfonate constructed the bridge is indicated.

[0007] the European Patent application public presentation 0th -- 510 246 A number divides, the copolymer of N-vinyl carboxamide and the partial saturation alkylamide permuted by the sulfonate radical which constructed the bridge is indicated, and this is also suitable as a thickener. this sulfonic group -- surely -- the form of the acid of isolation -- or it is an alkali-metal salt.

[0008]

[Explanation of this invention] The ammonium salt of various acrylamide alkyl sulfonic acids to a surprising thing, It is especially 2-acrylamide. - 2 - The ammonium salt of a methyl propane sulfonic acid The solvent which can be permitted for the application of cosmetics, for example, alcohol, alcoholic mixture, It is especially tert. - In the butanol, it is fully meltable and are very suitable copolymerizing with meltable N-vinyl carboxamide similarly in these solvents or a solvent mixture so. Moreover, it was found out here that this is very suitable also as a monomer which works as a bridge formation object. In contrast with this, it is indispensable to work in an aprotic solvent with the conventional technique. 2-acrylamide -2 used for a polymerization - Since the ammonium salt of a methyl propane sulfonic acid is the form of ionicity, it is not necessary to neutralize by the complicated approach any longer, and the copolymer which is obtained and over which the bridge was constructed can be immediately used as a thickener after a polymerization and removal of a solvent. Furthermore, as another advantage, the ratio of the configuration unit of ionicity and a neutral configuration unit can be adjusted by N-vinyl carboxamide incorporated as a comonomer, a thickening-ized operation and ammonium-chloride quality are adjusted by it, and it becomes possible to make it suit good by specific demand. Furthermore, the alcohol which has less than 10% of the weight of water content or alcoholic mixture, especially tert - By carrying out a polymerization in a butanol, about the amount of residuals of the solvent which remains into a product, it can approve in respect of toxicity and the product which can so be used, for example in cosmetics is obtained.

[0009] This invention is a polymer of water solubility or water bloating tendency which has the grain size of 10 micrometers or less preferably, is distribution random to everything but 0.01 - 5 % of the weight of cross-linking structures originating in the monomer which has at least two olefin nature double bonds, and is the following repeat structural units (1). Repeat structural unit (2) 49.99-98.99 of 1 - 50 % of the weight, and the following The above-mentioned polymer containing weight % is offered.

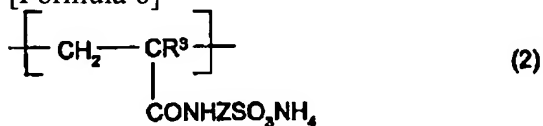
[0010]

[Formula 5]



[0011]

[Formula 6]



[0012] Mutually-independent [ of R<sup>1</sup>, R<sup>2</sup>, and R<sup>3</sup> ] is carried out among a formula, and it is a hydrogen atom, or is a methyl group, and Z is a C<sub>1</sub>-C<sub>4</sub>-alkylene group.

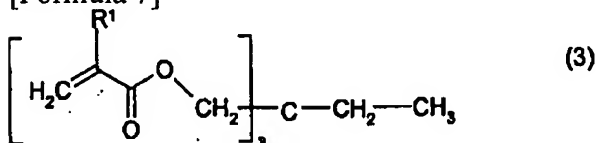
[0013] A thing desirable among the polymers of this invention is a formula (1). It is 2 - 30% of the weight of a rate about a structural unit and the structural unit preferably guided from N-vinyl formamide. formula (2) a structural unit -- desirable -- 2-acrylamide-2- It comes out comparatively. the structural unit guided from the ammonium salt of a methyl propane sulfonic acid -- 69.5 - 97.5 % of the weight -- And it is the polymer which includes the cross-linking structure originating in the monomer which has at least two olefin nature double bonds at 0.5 - 2% of the weight of a rate.

[0014] The structure originating in the monomer which has at least two olefin nature double bonds for which a bridge can be constructed is preferably guided from dipropylene glycol diaryl ether, polyglycol diaryl ether, triethylene glycol divinyl ether, hydroquinone diaryl ether, tetra-allyloxy ethane, other allyl compounds or vinyl ether, polyfunctional alcohol, tetraethylene glycol diacrylate, a triaryl amine, trimethylol propane diaryl ether, methylenebis acrylamide, or a divinylbenzene.

[0015] The above-mentioned cross-linking structure is the following formulas (3) especially preferably. It is guided from the monomer expressed.

[0016]

[Formula 7]



[0017] R1 is hydrogen or methyl among a formula.

[0018] in order that the desirable approach for manufacturing the polymer of this invention may carry out the polymerization of the polymer -- a 49.99-98.99 the weight section -- desirable -- the 69.5 - 97.5 weight section -- especially -- following formula (4) [0019 of the amount of the 84.5 - 96.5 weight section -- ]

[Formula 8]



[0020] The ammonium salt of the acrylamide alkyl sulfonic acid expressed with [the inside of a formula, and R3 and Z are as having given the definition above] Whether it dissolves or distributes in an alcoholic solvent or a solvent mixture, and 49.99-98.99 The amount of the weight section, the above-mentioned formula (4) Dissolve or distribute the acrylamide sulfonic acid of the isolation guided in an alcoholic solvent or a solvent mixture, and this acid is converted into ammonium salt by introducing ammonia or an ammoniacal solution. from -- b) the solution or dispersion liquid obtained by Above a -- 1 - 50 weight section -- desirable -- 2 - 30 weight section -- especially -- following formula (5) [0021 of the amount of 3 - 15 weight section -- ]

[Formula 9]



[0022] N-vinyl carboxamide expressed with [being as having carried out mutually-independent [ of R1 and R2 ], and having given the definition above among a formula] is added. c) To the solution or dispersion liquid obtained by Above b, 0.01 - 5 weight section, A kind which has at least two double bonds of the amount of 0.5 - 2 weight section preferably, or the cross-linking matter beyond it is added. And d A polymerization is started by the well-known approach in itself using a free radical formation compound. A polymerization is performed at the temperature of 10 - 150 \*\*, and the alcoholic solvent or solvent mixture used by a contains what the polymer to produce is chosen for so that it may almost be insolubility in this solvent or a solvent mixture in this case.

[0023] two sorts, the water-soluble alcohol which the above-mentioned polymerization reaction is desirable and has 1-4 carbon atoms, or this kind of alcohol, or the mixture of the thing beyond it -- desirable -- tert- It is carried out in a butanol. The water content of the mixture of the alcohol beyond this alcohol, two sorts, or it must not exceed 10 % of the weight. It is because a possibility that a massive object may arise is between polymerizations when this value is exceeded. Specifically, for the class and amount of a solvent, the acrylamide alkyl sulfonic acid produced by installation of ammonia or

an ammoniacal solution or it was used is especially the 2-acrylamide -2. - It is chosen so that most amounts of the ammonium salt of a methyl propane sulfonic acid may be dissolved or distributed. The expression of "almost dissolving or distributing" means that a solid ingredient does not precipitate from this solution or dispersion liquid, also after turning off the switch of an agitator. On the other hand, most polymers produced during a reaction should be insolubility in the selected solvent (or solvent mixture). this -- " -- the expression of almost insoluble" -- under a polymerization -- stirring -- easy -- it is muddy (pulpy) Although a polymer paste arises, it means that a massive object or a conglutination object must not be produced in it in this case. The filtrate which can be obtained by carrying out suction filtration of this paste must have at most 5% of the weight of solid content. When the polymer produced in the selected solvent or the solvent mixture is meltable at quantity extent, in case a polymer paste is dried, there is a possibility that an aggregate may arise.

[0024] The polymerization reaction itself is started using the initiator (for example, azobisisobutyronitril) of a free radical formation compound, for example, an azo system, a peroxide (for example, dilauryl peroxide), or persulfate by 20-120 \*\* and the desirable approach that it is well-known in itself within suitable temperature spacing of 40-80 degrees C, and 30 minutes - several hours are continued.

[0025] The presentation of a copolymer is changeable by changing the above-mentioned delivery late of each monomer, and the content of cross-linking structure, and it can be used in order to obtain the specific property profile so considered as a request. If more ammonium salt of an acrylamide sulfonic acid is incorporated, a thickening-ized operation of a polymer can be raised, for example, and on the other hand, if N-vinyl carboxamide is incorporated by higher weight %, the solubility of that over the system of the electrolyte compatibility of a polymer and nonaqueous nature can be raised.

[0026] as 1% concentration water solution -- neutrality -- or -- small -- the alkaline range -- setting -- 30,000mPa(s).s Although high viscosity is shown, as for the thickening-ized force (or viscosity measured), in contrast with the polymer based on the acrylic acid which falls greatly as pH falls, the copolymer of this invention can maintain the viscosity to the acidity pH of about 3 in 1% concentration water solution.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

[The technical field to which invention belongs] This invention relates to the approach of using it for the manufacture approach of the copolymer of the water solubility or water bloating tendency based on the ammonium salt of an acrylamide alkyl sulfonic acid, and N-vinyl carboxamide and the approach of using this as an emulsion and the thickener of dispersion liquid, and a stabilizer, and a list as lubricant in the cosmetics constituent and drugs constituent for adjusting the viscosity of a water solution.

**[0002]**

[Description of the Prior Art] or [ that the multicomponent system containing water or a solvent, for example, a solution, an emulsion, or suspension is often adjusted by higher viscosity in consideration of stability from the reason of costs or an engine-performance side ] -- or it is thickening-ized. For example, by raising the viscosity of the continuous phase of an emulsion or suspension, or a discontinuous phase, time amount until each component of such a system dissociates can be extended considerably, and this becomes clear from storage life being prolonged. Moreover, by raising viscosity, they can be applied more now to homogeneity and the effectiveness is remarkable in many systems on the front face which is not especially flat. In the case of a skin care supply and the ointment-like drugs for the skins, this is applied especially. It can prevent these agents flowing out of the front face which should be processed at the beginning of a stage by [ of many industrial products, for example, wallpaper, ] removing and raising those viscosity in the case of \*\*, a paint remover, or the anti-icing agent of an airplane. Effectiveness increases by lengthening applying to homogeneity more, and contact time. The high viscosity of this kind of formulation other than the advantage in respect of the above-mentioned engine performance also brings about the further advantage in the case of preparation, a package, containerization, and storage, and the advantage in the case of transportation in a list, and especially thickening-ization of an acid medium is meaningful from a safety aspect in this case.

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[0004] Many various systems are indicated by the reference by the expert about accommodation of the flowability of the system containing a water system or a water solvent, an emulsion, and suspension. A well-known example is cellulose ether and other cellulose (for example, a carboxymethyl cellulose, hydroxyethyl cellulose), gelatin, starch and the derivative of starch, sodium alginate, fatty-acid polyethylene glycol ester, an agar, tragacanth gum, or a dextrin. The synthetic polymers used are the mixture with the above-mentioned various compounds in the copolymer of the various salts of various ingredients, for example, polyvinyl alcohol, polyacrylamide, polyacrylic acid, and polyacrylic acid, a polyvinyl pyrrolidone, polyvinyl methyl ether, polyethylene oxide, a maleic anhydride, and vinyl methyl ether, and a list, and a copolymer.

[0005] However, the above-mentioned compound has various faults at the time of use. For example, these compounds are very sensitive to a cellulosic and the ingredient list based on a natural raw material generally to bacteria. Those most cause the phenomenon of forming the gel which is not desirable and "which pulls yarn", in the case of use. Tending to hydrolyze fatty-acid polyethylene glycol ester under existence of water, the produced insoluble fatty acid causes the cloudiness which is not desirable. Depending on the origin, as for the thickener (for example, an agar or tragacanth gum) based on a natural product, a presentation is changed sharply.

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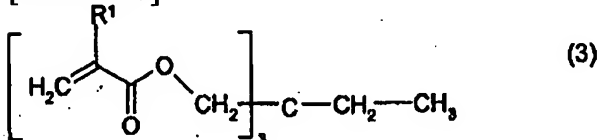
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[0026] as 1% concentration water solution -- neutrality -- or -- small -- the alkaline range -- setting -- 30,000mPa(s).s Although high viscosity is shown, as for the thickening-ized force (or viscosity measured), in contrast with the polymer based on the acrylic acid which falls greatly as pH falls, the copolymer of this invention can maintain the viscosity to the acidity pH of about 3 in 1% concentration water solution.

[0027]

[Example] Example 1: an anchor type agitator, a reflux condenser, an internal thermometer, and N<sub>2</sub> and NH<sub>3</sub> the flask of 1000ml volume equipped with the supply option -- tert- Butanol 490.5 g and 11.5g of water were thrown in. Subsequently, 2-acrylamide -2 - It was made to distribute, introducing methyl propane sulfonic-acid 80.75 g, and stirring violently. Under the present circumstances, the cloudiness of a solvent was held. Over 30 minutes, ammonia 6.64g was introduced into the upper gaseous phase, and the mixture in a flask was stirred for 30 more minutes at least until pH was set to 6-7. In order to add N-vinyl formamide 4.25g and trimethylolpropane triacrylate 1.45g and to suppress the loss between this addition to the minimum, in each case, it is tert about an acceptor. - The flash plate was carried out by the butanol (about 6ml). Subsequently, this reaction mixture was heated in temperature of 60 degrees C. Under the present circumstances, this reaction mixture was inactivated by introducing N<sub>2</sub> into coincidence. After temperature became 60 degrees C, dilauryl peroxide 1.0 g was added. After adding an initiator, the reaction started immediately. Initiation of this reaction can be checked from a rise and polymer of temperature condensing (flocculation). Supply of nitrogen was cut, when 15 minutes passed about after the polymerization reaction was started. After having added the dilauryl peroxide of an initiator and about 30 minutes had passed, temperature reached the peak price (about 65-70 degrees C).

After passing over this peak price, for 30 more minutes, this mixture was heated to reflux temperature and, subsequently to the bottom of these conditions, was stirred for 2 hours. Although the contents of a reaction container became the pulp's consistency between reactions, it was in the condition which can be stirred still more easily. Subsequently, this mixture was cooled to the room temperature, and suction filtration of the solid was carried out. When the obtained paste was dried at 60-70 degrees C in the vacuum-drying interior of a room for 24 hours, 92.2g of detailed white powder was obtained.

Example 2: although Example 1 was repeated, 1.65g of trimethylol propane methacrylate was used instead of the trimethylolpropane triacrylate as cross-linking matter.

Example 3: Example 1 -- following -- 2-acrylamide-2- The copolymer over which the bridge was constructed from 34g [ of methyl propane sulfonic acids ] and N-vinyl formamide 51g and trimethylolpropane triacrylate 1.9 g was manufactured.

Example 4: Example 1 -- following -- 2-acrylamide-2- The copolymer over which the bridge was constructed from 76.5g [ of methyl propane sulfonic acids ] and N-vinyl formamide 8.5 g and trimethylolpropane triacrylate 1.9 g was manufactured.

Test result: It is the powder which might be followed by each above-mentioned example, respectively 1.0 It dissolved into distilled water by the concentration of weight %, and the viscosity of the gel produced by this was measured at 25 degrees C. For that, it is 600ml in 5g of polymer powder which was dried in each case. It is 20rpm about the viscosity of the gel which mixed into distilled water 495 g in the beaker, and was produced by it. It is RVT at rotational speed. It measured using the Brookfield viscometer. Thus, the prepared gel gives comfortable sensibility to the skin, when it applies to the body, therefore it is suitable for especially the application of cosmetics.

[0028] Similarly, when acid stability also measures viscosity using the above-mentioned Brookfield viscometer, it asks. For that, the copolymer manufactured by carrying out like the example 1 of manufacture was compared with the polymer (Carbopol (R) 934 Goodrich shrine make) of marketing based on an acrylic acid. The gel of 1.0 % concentration was prepared from these two polymers using the above-mentioned approach, respectively. The pH value of such gels is NaOH or H<sub>3</sub>PO<sub>4</sub> in that case. It is an acid value (pH = about 3) or an acid, neutral value (pH=6 -7) by adding suitably. It adjusted.

Table: Viscosity pH measured about the above-mentioned 1.0 % concentration gel Polymer of Example 1 Carbopol 9346-7 64,200 mPa-s 76,600 mPa-s 3 [ about ] 50,200 mPa-s As shown in the table of 140 mPa and s above, as for the polymer of this invention, even in Acidity pH, a very good thickening-ized property is indicated by contrast to be a polymer based on an acrylic acid.

[0029] The copolymer of this invention deserves attention in that the concentration of a solid copolymer shows a good thickening-ized operation in cosmetics and a drugs formulation in 0.7 - 1 % of the weight 0.5 to 2% of the weight 0.1 to 5% of the weight especially preferably on the basis of the good thickening-ized operation and the constituent finished especially. Under a room temperature, it is 60,000 mPa-s at pH of 6-7 in deionized water. The viscosity which exceeds is attained.

[0030] The copolymer of this invention is crossed to pH of the large range, especially the pH range of 2.5-7, and causes only a comparatively slight viscosity change. Furthermore, in the compound, they can hold underwater good solubility and can wash it out from the skin easily. Those thickening-ized properties and stabilization characteristics take effect also in aqueousity, liquorishness, and/or a glycol content solution. Moreover, these are stable to ultraviolet rays and stable over a 0 more degree C - 50 degrees C large temperature requirement.

[0031] By changing the content of the class of the acrylamide sulfonic-acid ammonium salt of a monomer, and N-vinyl carboxamide, and cross-linking structure, it sets to both the emulsion of an oil-in-water type, and the emulsion of a water-in-oil type, and is 7-2.5. The copolymer which can be used as a thickener by pH is obtained. Regardless of whether the high cream and the ointment of whether a lotion with comparatively low viscosity is prepared and viscosity are prepared, an emulsion contains oil and is [ a kind of 25 - 85% of the weight of a rate or the emulsifier beyond it and an oil phase, and ] the whole preferably five to 95% of the weight 100 It essentially consists of water made into weight %. The oil to be used is vegetable oil, animal oil, mineral oil, and synthetic oil. For example, he is Guerbet (Guerbet) who has 8-10 carbon atoms preferably 6-18 pieces. Alcohol, a line -- C<sub>6</sub>-C<sub>13</sub>- a fatty acid and

a line -- C6-C20- ester with fatty alcohol -- a branching-like C6-C13-carboxylic acid and a line -- C6-C20- ester with fatty alcohol -- a line -- C6-C18- a fatty acid, branching-like alcohol, especially ester with 2-ethylhexanol -- Ester with a line and/or a branching-like fatty acid, polyhydric alcohol (for example, dimer diol or trimer diol), and/or Guerbet Al Kohl, C6-C10 - They are the triglyceride based on a fatty acid, vegetable oil, branching-like primary alcohol, the permuted cyclohexane, GERUBE carbonate, the dialkyl ether and/or aliphatic series, or aromatic hydrocarbon.

[0032] This emulsion can be the form of a skin care supply, for example, a day cream, a night cream, a care cream, a nourishment cream, a body lotion, ointment, and these imitations, and can contain a coemulsifier, a superfatting agent, a fat, a wax, a stabilizer, the source (biogenic) active ingredient of a living thing, glycerol, antiseptics, a pearly luster agent, a color, and a fragrance as other assistants and additives.

[0033] Possible superfatting agents are matter, such as a lanolin derivative formed into the poly ethoxyl, for example, a RECHICHIN derivative, polyol fatty acid ester, monoglyceride, and fatty acid alkanolamide, and, in addition, the latter fatty acid alkanolamide works also as a cellular stabilizer. The examples of a type of a fat are glyceride, and a suitable wax is divided, it is beeswax, paraffin wax, or micro wax, and these waxes are used combining the wax of a hydrophilic property, for example, cetyl stearyl alcohol, depending on the case.

[0034] The stabilizer which can be used is the metal salt, for example, the magnesium stearate, aluminum stearate, and/or zinc stearate of a fatty acid. The examples of the source active ingredient of a living thing are a plant extract and vitamin complex. Suitable antiseptics are phenoxyethanol, a formaldehyde solution, paraben, pentanediol, or a sorbic acid.

[0035] A suitable pearly luster agent is fatty-acid mono-glycol ester at for example, glycol stearic acid ester, for example, ethylene glycol distearate, and a list. the matter which was suitable for the color which can be used for the cosmetics purpose, and was recognized -- it is -- for example, soybean commission (Dyes Commission) of a THE German research society from -- published "Kosmetische Faerbemittel", Verlag Chemie, Weinheim, 1984, and 81-106 It is the matter indicated by the page.

[0036] The amount of an assistant and an additive can be the sum total, and can be 2 - 5 % of the weight preferably one to 10% of the weight on the basis of the whole constituent.

[0037] These constituents are well-known approaches (hot), i.e., heat, in itself. The emulsifying method, heat-heat / the cold (hot-hot/cold) emulsifying method, or PIT It can prepare by the emulsifying method.

[0038] Although the following examples illustrate the possible application of the thickener of this invention in a detail more, the application of this invention is not limited to this. In all cases, the displayed percentage is based at weight.

Example 1: [ ] O/W Cream A Hostacerin DGI (Clariant GmbH) 2.00% the mineral oil of low viscosity - 8.00 % palmitic-acid isopropyl 4.00% Eutanol G (Henkel) 4.00%B Copolymer (Clariant GmbH) 1.20%C Hostapon KCG (Clariant GmbH) 0.80% Water Amount which makes the sum total 100 % Antiseptics It is an amount D suitably. Fragrance 0.40% preparation procedure I B is mixed with A, and subsequently C is added, and it fully stirs, and is II. D is mixed with Above I and it is III. It homogenizes.

Example 2: [ ] O/W skim milk A Hostacerin DGMS (Clariant GmbH) 2.00% the mineral oil of quantity viscosity -- 8.00% Palmitic-acid isopropyl 5.00% Cetiol 868 (Henkel) 4.00%B Copolymer 0.50%C Hostapon KCG (Clariant GmbH) 2.00% Glycerol 4.00% Water Amount which makes the whole 100 % Antiseptics It is an amount D suitably. Fragrance 0.30% preparation procedure I A is heated and fused even at about 70 degrees C, and B is added, and it is II. C is heated at about 70 degrees C, and it is III. It stirs until it mixes Above II with Above I and gets cold, and it is IV. D is added at about 35 degrees C, and it is V. It homogenizes.

Example 3: [ ] O/W Skim milk A Hostacerin DGL (Clariant GmbH) 2.00% Palmitic-acid isopropyl 4.00% Almond oil 5.00% Wheat germ oil 1.00% Cetiol SN (Henkel) 8.00%B Copolymer 0.60%C Water Amount which makes the whole 100 % Antiseptics It is an amount D suitably. Fragrance 0.30% preparation procedure I A and B are mixed, and C is mixed and it is II. D is added and it is III. It

homogenizes.

Example 4: [ ] O/W Skim milk A Hostaphat CG 120 (Clariant GmbH) 1.50% the mineral oil of low viscosity -- 5.00% Miglyol 812 (Dynamit Nobel) 4.00% Palmitic-acid isopropyl 6.00% Soybean oil 3.00% Jojoba oil 2.00%B Copolymer 0.80%C Hostapon KCG (Clariant GmbH) 1.00% Water Amount which makes the whole 100 % Glycerol 3.00% Soda (10% of underwater) 1.20% Antiseptics It is an amount D suitably. Fragrance 0.30% preparation procedure I B is mixed with A, and C is added, and it mixes well, and is II. D is added and it is III. It homogenizes.

[0039]

Commercial product (R) Hostacerin DGI (Clariant GmbH) Poly glyceryl -2 sesqui-isostearate (R) Eutanol G (Henkel) An octyl dodecanol copolymer Copolymer of Example 1 (R) Hostapon KCG (Clariant GmbH) Cocoyl sodium glutamate Hostacerin DGMS (Clariant GmbH) Poly glyceryl -2 stearate (R) Cetiol 868 (Henkel) Stearin acid octyl Hostacerin DGL (Clariant GmbH) Poly glyceryl-2 PEG-10 Laurate (R) Cetiol SN (Henkel) SETEA reel iso nonanoate (R) Hostaphat CG 120 Octyl (Clariant GmbH) DESHIRU phosphate (R) Miglyol 812 (Dynamit Nobel) Capryl lactam triglyceride

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[Translation done.]

## \* NOTICES \*

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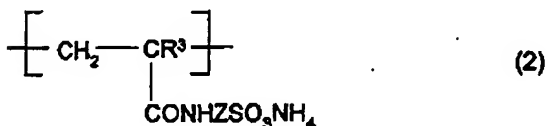
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## CLAIMS

[Claim(s)]

[Claim 1] To everything but 0.01 - 5 % of the weight of cross-linking structures originating in the monomer which has at least two olefin nature double bonds, they are the following formulas (1). 1 - 50 % of the weight of repeat structural units, and the following formulas (2) Repeat structural unit 49.99-98.99 Polymer of the water solubility or water bloating tendency which contains weight % by random distribution.

[Formula 1]



Mutually-independent [ of R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> ] is carried out among a formula, and it is a hydrogen atom or a methyl group, and Z is a C1-C4-alkylene group.

[Claim 2] To everything but 0.5 - 2 % of the weight of cross-linking structures originating in the monomer which has at least two olefin nature double bonds, it is the above-mentioned formula (1). 2 - 30 % of the weight of repeat structural units, and the above-mentioned formula (2) Polymer of the water solubility of claim 1 which includes 69.5 - 97.5 % of the weight of repeat structural units by random distribution, or water bloating tendency.

[Claim 3] To everything but 0.5 - 2 % of the weight of cross-linking structures originating in the monomer which has at least two olefin nature double bonds, it is the above-mentioned formula (1). 3 - 15 % of the weight of repeat structural units, and the above-mentioned formula (2) Polymer of the water solubility of claim 1 which includes 84.5 - 96.5 % of the weight of repeat structural units by random distribution, or water bloating tendency.

[Claim 4] Formula (2) A repeat structure element is 2-acrylamide. - 2 - Polymer of the water solubility of claim 1 guided from the ammonium salt of a methyl propane sulfonic acid, or water bloating tendency.

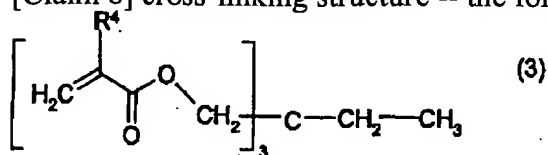
[Claim 5] Formula (1) Polymer of any one water solubility of claims 1-4 to which a repeat structure element is guided from N-vinyl formamide, or water bloating tendency.

[Claim 6] The polymer of any one water solubility of claims 1-5 in which a polymer has the average grain size of 10 micrometers or less, or water bloating tendency.

[Claim 7] The polymer of any one water solubility of claims 1-6 to which cross-linking structure is guided from dipropylene glycol diaryl ether, polyglycol diaryl ether, triethylene glycol divinyl ether, hydroquinone diaryl ether, tetra-allyloxy ethane, other allyl compounds or vinyl ether, polyfunctional

alcohol, tetraethylene glycol diacrylate, a triaryl amine, trimethylol propane diaryl ether, methylenebis acrylamide, or a divinylbenzene, or water bloating tendency.

[Claim 8] cross-linking structure -- the following formulas (3) -- [Formula 2]



It is the polymer of any one water solubility of claims 1-7 guided from the monomer expressed with [the inside of a formula and R4 are hydrogen or methyl], or water bloating tendency.

[Claim 9] It is the manufacture approach of the polymer of any one water solubility of claims 1-8, or water bloating tendency, and is a. Formula (4) which is the following [Formula 3]



It is the ammonium salt 49.99-98.99 of the acrylamide alkyl sulfonic acid expressed with [the inside of a formula, and R3 and Z are as having given the definition above]. [ whether the weight section is dissolved or distributed in an alcoholic solvent or a solvent mixture, and ] or the above-mentioned formula (4) from -- acrylamide sulfonic acid 49.99-98.99 of the isolation guided It dissolves or distributes. The weight section in an alcoholic solvent or a solvent mixture and the thing for which ammonia or an ammoniacal solution is introduced -- this acid -- ammonium salt -- converting -- b the solution or dispersion liquid obtained by Above a -- the following formulas (5) -- [Formula 4]



N-vinyl carboxamide 1 expressed with [the inside of a formula, and R1 and R2 are as having defined by claim 1] - 50 weight sections are added. c) A kind or the cross-linking matter 0.01 beyond it - 5 weight sections which have at least two double bonds are added to the solution or dispersion liquid obtained by Above b. And d A polymerization is started by the well-known approach in itself using a free radical formation compound. And it is the above-mentioned approach perform a polymerization at the temperature of 10 - 150 \*\*, and the polymer which produces the alcoholic solvent or solvent mixture used by Above a in this case contains what is chosen so that it may almost be insolubility in this solvent or a solvent mixture.

[Claim 10] How to use any one polymer of claims 1-9, in order to thickening-ize a fluid.

[Claim 11] How to use any one polymer of claims 1-9, in order to thickening-ize the formulation for makeup, or the formulation for drugs.

[Claim 12] It is a polymer preferably 0.1 to 5% of the weight 2-0.5 They are weight % and the usage of the polymer of claims 10 or 11 especially used in 0.7 - 1% of the weight of an amount preferably.

[Claim 13] 2.5 - 7 -- desirable -- 3.0-5.0 Usage of the polymer of claims 10 or 11 used in the pH range.

[Translation done.]